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BETH READ
PATENT LEGAL STAFF
EASTMAN KODAK COMPANY
343 STATE STREET
ROCHESTER, NY 14650-2201

EXAMINER	
EDWARDS, PATRICK L	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/960,276	EDGAR, ALBERT D.	
	Examiner	Art Unit	
	Patrick L. Edwards	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *11 and 30* is/are allowed.

6)☒ Claim(s) *1-10, 12-29, 31-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09-02-2005 has been entered.

Response to Arguments

2. Applicant's arguments filed on 09-02-2005 have been fully considered. A response to these arguments is provided below.

Prior Art Rejections

Summary of Argument:

(a) Applicant alleges that Fang fails to disclose the added claim 1 limitation of applying a dynamic image mask value to the image value for each corresponding pixel using a mathematical function to control contrast and produce an enhanced imaged having improved detail. Specifically applicant argues that Fang is directed to methods for smoothing, not contrast control (see remarks pgs. 12-13).

(b) Applicant generally alleges that the remaining claims are patentable over the cited prior art (remarks pg. 13-21).

Examiner's Response:

(a) Applicant's arguments have been fully considered but are unpersuasive. Contrary to applicant's assertion, the Fang disclosure controls contrast. Contrast is defined generally in the art as a degree of difference between the lightest and darkest parts of an image. Fang meets this limitation in all of the disclosed embodiments. A smoothing filter contrails contrast because the edges are smoothed, the image is blurred and contrast is limited. An edge preserving filter increases contrast or keeps contrast constant by ensuring that the edge differences remain. Thus, the Fang disclosure—in either of these capacities—meets this claimed limitation.

Respecting the additional limitation of producing an image "having improved detail", Fang also discloses this feature generally throughout the reference.

The above response is incorporated herein into the below rejection.

(b) Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Allowable Subject Matter

3. Claims 11 and 30 are allowed.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 10, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Fang et al. (US Pat. No. 5,771,318).

With regard to claim 1, Fang discloses a digital original image comprised of pixels, wherein each pixel includes an original value corresponding to a characteristic of the image (see the "input data" from Figure 2 of Fang).

Fang further discloses calculating a dynamic image mask for each pixel by averaging the original value of a pixel with the original values of the pixels proximate to that pixel having original values lower than a threshold sharpness (col. 5 lines 24-27). Fang discloses that when alpha = infinity, the threshold sharpness is set to a value just above the smallest directional variance. We can tell this because only the the directional mean with the smallest directional variance is used in the weighted averaging.

Fang further discloses applying the dynamic image mask value to the original value for each corresponding pixel using a mathematical function to produce an enhanced image (see Figure 2 with col. 6 lines 51-56). This step is performed in the final compute means 15, which is discussed in the cited passage and shown in Figure 2 of Fang. The output data from the final compute means disclosed in Fang is analogous to the enhanced image recited in the claim. We can also conclude that the final compute means applies to image mask to the original image using a mathematical function, since any computation is inherently a mathematical function.

With regard to claim 10, Fang further discloses that the step of combining the dynamic image mask with the original image is performed through mathematical manipulation which includes division (col. 6 lines 51-65 and col. 5 lines 57-63). The results of Fang's final compute means 15 is the output data (col. 6 line 65). The output data in the Fang reference is denoted as g(i,j), and Fang discloses an equation for determining this output which indeed uses division. Therefore, we can conclude that the final compute means includes division.

With regard to claim 13, Fang further discloses that the enhanced scanned image includes an image contrast and a grayscale contrast. The Fang reference makes no mention of color image data, so we can assume that Fang strictly discloses processing grayscale data. It follows that Fang's output enhanced image includes a grayscale contrast. However, since the image is a grayscale image only, we can safely say that the grayscale contrast of the Fang image also qualifies as the "image contrast".

With regard to claim 15, Fang discloses that the dynamic image mask value may be proportionally varied by a user (Fang col. 5 lines 36-44). Fang discloses that the user can vary the value of alpha, which in turn varies the image mask value.

6. Claims 26-29, 32, 33, 35 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Fang et al. (US Pat. No. 5,771,318).

With regard to claim 26, Fang discloses obtaining a dynamic image mask, the dynamic image mask and the information representative of the image each including a plurality of pixels having varying values (col. 6 lines 34-43). The output of the adaptive weighting process means 13 disclosed in Fang is analogous to the dynamic image mask recited in the claim.

Fang further discloses that the plurality of pixels output from the adaptive weighting process means are set to form sharper edges corresponding to more rapidly changing pixel values in the original image and less sharp regions corresponding to areas of less rapidly changing pixel values in the original image (col. 4 lines 43-55).

Fang further discloses combining the dynamic image mask with the original image to produce the enhanced image (col. 6 lines 51-56). This step is performed in the final compute means 15, which is discussed in the cited passage and shown in Figure 2 of Fang. The output data from the final compute means disclosed in Fang is analogous to the enhanced image recited in the claim.

Fang further discloses that this method is performed by software (col. 7 lines 5-6). It follows that this software is inherently embodied in a computer-readable medium. Therefore, a computer readable medium is inherent in the teachings of Fang.

With regard to claim 27, Fang further discloses that the input data includes an amount of image detail encoded in the physically reproducable dynamic range, wherein the enhanced image includes an increased amount of detail encoded in the physically reproducible dynamic range (col. 6 line 66 – col. 7 line 1). The dynamic range remapping disclosed in Fang produces an increased amount of detail for the physically reproducible dynamic range.

With regard to claims 28 and 29, Fang further discloses that the step of combining the dynamic image mask with the original image is performed through mathematical manipulation which includes division (col. 6 lines 51-65 and col. 5 lines 57-63). The results of Fang's final compute means 15 is the output data (col. 6 line 65). The output data in the Fang reference is denoted as g(i,j), and Fang discloses an equation for determining this output which indeed uses division. Therefore, we can conclude that the final compute means includes division.

With regard to claim 32, Fang further discloses generating a dynamic image mask pixel by averaging the value of a central pixel corresponding to the pixel in the original image with weighted values of a plurality of neighboring pixels in the original image (col. 4 lines 43-55).

With regard to claim 33, Fang further disclsoses that the weighting of the plurality of neighboring pixels is dependent on a proximity of the neighboring pixels to the central pixel and a contrast of the plurality of neighboring pixels to the central pixel (col. 2 lines 18-30).

With regard to claim 35, Fang discloses that the value of a pixel in the dynamic image mask is generated based on a relationship of the values of different characteristics (col. 3 lines 63-65). The directional mean and directional variance disclosed in Fang, which determine the weighting factors that in turn determine the mask pixel values, qualify as different characteristics as recited in the claim.

With regard to claim 37, Fang discloses software operable to perform the steps of a method. We can conclude that this software resides on a computer, because software systems are inherently executed on some sort of computing device. Consequently, this limitation is inherent in the teachings of Fang.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2-5, 6, 8, 13-14, 16-20 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claim 1 above, and further in view of Fujimoto et al. (USPN 5,771,107). The arguments as to the relevance of Fang as applied above are incorporated herein.

With regard to claims 2 and 3, Fang fails to expressly disclose a method for capturing the image data. Fujimoto, however, discloses a scanner for reading in images (Fujimoto col. 1 lines 28-30). This scanner qualifies as a digital capture device and an imaging system. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's image enhancement system by adding an image sensor for acquiring images as taught by Fujimoto. Such a modification would have allowed for the enhancement of images captured by scanners, digital cameras, CCD's and any other modern image pickup device which employs an image sensor. This would have made for a more robust and widely usable invention.

With regard to claims 4 and 5, the scanner 2 shown in Figure 1 of Fujimoto captures color image data (Fujimoto col. 1 lines 37-40). Since each individual color corresponds to a unique range of frequencies, The Fujimoto color scanner meets the claim 5 limitations as well.

With regard to claim 6, the further limitations of the claim have been discussed in the above argument with respect to claim 1.

With regard to claim 8, Fujimoto further discloses detecting edges (i.e. calculating the difference less than the sharpness threshold) using black image data, which is different from the original color values which are used in averaging (see Fujimoto Figure 1).

With regard to claims 13 and 14, Fang discloses that a contrast can be controlled (Fang col. 6 line 65 – col. 7 line 3), but fails to disclose an image with two types of contrast. Fujimoto, however, discloses processing on black image data and color image data (Fujimoto col. 9 lines 8-16). It follows that the grayscale contrast and the image contrast are not the same thing and consequently can be controlled independently.

With regard to claim 16, Fang disloses that the image enhancing method is performed by software (Fang col. 7 lines 5-9). It follows that Fang inherently discloses the claimed processor and memory media. Fang, however, fails to expressly disclose a sensor system for acquiring the image data. Fujimoto, however, discloses a scanner for reading in images (Fujimoto col. 1 lines 28-30). This scanner qualifies as a digital capture device and an imaging system. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's image enhancement system by adding an image sensor for acquiring images as taught by Fujimoto. Such a modification would have allowed for the enhancement of images captured by scanners, digital cameras, CCD's and any other modern image pickup device which employs an image sensor. This would have made for a more robust and widely usable invention.

With regard to claim 17, the scanner discloses in Fujimoto operates to measure light.

With regard to claims 18 and 23, Fang further discloses measuring a magnetic resonance pulse (Fang col. 5 lines 50-52).

With regard to claims 19 and 25, Fujimoto discloses a printer (see Figure 1). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the image enhancement system of Fang, to include a printer as taught by Fujimoto. Such a modification would have allowed for a method of printing out a hard copy of the enhanced image.

With regard to claims 20, Fujimoto further discloses a photographic printer (Fujimoto col. 1 lines 28-32).

With regard to claim 24, Fujimoto discloses a scanner which scans an image to produce a digital representation. In order for this scanner to function it requires software loaded into it which will cause the scanner to execute the necessary steps. Consequently, we can conclude that this limitation is inherently disclosed the combination of Fang and Fujimoto.

9. Claims 7 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claims 1 and 26 above, and further in view of Qian (USPN 6,707,940). The arguments as to the relevance of Fang as applied above are incorporated herein.

With regard to these claims, Fang fails to expressly disclose the claimed formula for determining weighted original values. Qian, however, discloses using the claimed formula to calculate "smoothing factors" (Qian col. 2 lines 51-55). The smoothing factors disclosed in Qian are analogous to the weighted original values recited in the claim. It follows that the value DELTA(i) from Qian is analogous to the claimed difference between the pixel being weighed and the center pixel, and that the denominator value, Rp, from Qian is analogous to the claimed variable, GAIN. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's image enhancement method by determining weighting factors using the formula disclosed in Qian. Such a modification would have allowed for an easy and processor-friendly calculation that resulted in a weighting factor which was already normalized to a value between 0 and 1. This would have made for an efficient method of determining the weighting factor.

10. Claims 12 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claims 1 and 26 above, and further in view of Paik (USPN 6,370,279). The arguments as to the relevance of Fang as applied above are incorporated herein.

With regard to these claims, Fang fails to expressly disclose histogram leveling. Paik, however, discloses histogram equalization (Paik col. 9 lines 59-60). The histogram equalization disclosed in Paik is analogous to the claimed histogram leveling. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's image enhancing method by using histogram equalization to expand image contrast as taught by Paik. Such a modification would have allowed for an additional method of removing noise from an image (Paik col. 9 lines 63-64)

11. Claims 9 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claims 1 and 26 above, and further in view of Wober et al. (USPN 5,729,631). The arguments as to the relevance of Fang as applied above are incorporated herein.

With regard to claims 9 and 36, Fang fails to expressly disclose that the generation of the dynamic image mask includes performing a pyramidal decomposition on the original image. Wober, however, discloses performing a pyramidal decomposition on the original image in the generation of an image mask (Wober col. 14 lines 51-61). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's image mask generation by including a pyramidal decomposition as taught by Wober. Such a modification would have allowed for a compact image representation which was useful for image coding (col. 13 lines 57-58).

12. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claim 26 above, and further in view of Hu et al. (USPN 6,668,097). The arguments as to the relevance of Fang as applied above are incorporated herein.

With regard to claim 38, Fang fails to expressly disclose that the software operable to perform the steps of the disclosed method is stored on a digital camera. Hu, however, discloses a similar image processing method which is operable to be executed on a digital camera (Hu Figure 3 and col. 3 lines 11-14). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's software system so that it could reside and be executed on a digital camera as taught by Hu. Such a modification would have allowed for Fang's image processing method to be performed on image data captured via a digital camera. Given the ubiquitious nature of digital cameras, this would have been a practical and desirable modification.

13. Claims 39-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claim 26 above, and further in view of Fujimoto et al. (USPN 5,771,107). The arguments as to the relevance of Fang as applied above are incorporated herein.

With regard to claim 39, all of the limitations of the claim have been discussed in the above argument with respect to claim 26, except for the further limitation that the input image was acquired from an image sensor. Fang

discloses an image enhancement system, but fails to expressly disclose that the image is captured using an image sensor. Fujimoto, however, discloses a scanner for reading in images (Fujimoto col. 1 lines 28-29 and Figure 1). The scanner disclosed in Fujimoto qualifies as the claimed image sensor. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Fang's image enhancement system by adding an image sensor for acquiring images as taught by Fujimoto. Such a modification would have allowed for the enhancement of images captured by scanners, digital cameras, CCD's and any other modern image pickup device which employs an image sensor. This would have made for a more robust and widely usable invention.

With regard to claim 40, Fujimoto discloses a color decoder operably connected to the image sensor, which would generate color image data (col. 1 lines 37-40). In the cited passage, Fujimoto discloses generating color image information from the sensor. It follows that a color decoder, though not explicitly mentioned, is inherent in Fujimoto's image processing system. Looking at Figure 4 of Fujimoto, we can conclude that the color decoder, if explicitly recited, would be in between elements 2 and 3 of the Figure.

With regard to claim 41, the further limitation that a computer program is executed on an output of the image sensor and the result of the executed computer program is input to the color decoder is inherent in the Fujimoto reference. We can easily conclude that this limitation is inherent, because the color decoder relies on instructions (in the form of a computer program) in order to generate color image data from the output of the sensor. It follows that the color decoding operation can not be performed unless the color decoder receives proper instructions. Consequently, the limitations of claim 41 are inherent in the Fujimoto system.

With regard to claim 42, the complementary color reversing circuit 3, shown in Figure 4 of Fujimoto is analogous to the claimed color management system.

With regard to claim 43, the inherency argument applied above with respect to claim 41 is applicable to the claim 43 limitation as well. If the color management system is to perform any sort of processing on the color image data, then it requires a result of an executed program of instructions.

With regard to claim 44, the color decoder outputs R,G,B signals (Fujimoto col. 1 lines 37-40).

14. Claims 21, 22, 45-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Fang and Fujimoto as applied to claims 16, 39 and 42 above, and further in view of Tretter (USPN 5,867,606). The arguments as to the relevance of aforesaid combination as applied above are incorporated herein.

With regard to claims 21 and 45, the aforesaid combination fails to expressly disclose a memory for storing the color information. Tretter, however, discloses such a memory (Tretter col. 3 lines 40-42). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the color image processing system disclosed in the combination of Fang and Fujimoto by adding a memory for storing the color image data as taught by Tretter. Such a modification would have allowed for a system that could store scanned color image data for later processing. This would have made for a more robust system.

With regard to claim 22, the aforesaid combination fails to expressly disclose a digital camera or a video camera for capturing image data. Tretter, however, discloses a digital camera (Tretter col. 3 line 45) for inputting image information. It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the aforesaid combination to include a digital camera as a way of acquiring image data as taught by Tretter. Such a modification would have allowed for the combination of Fang and Fujimoto's image enhancing method to process image data captured from a digital camera. Given the popularity of digital cameras, this would have allowed for a more useful and marketable invention.

With regard to claim 46, the inherency argument used above with respect to claims 41 and 43 is applicable to the claim 46 limitation as well.

With regard to claim 47, Fujimoto fails to expressly disclose a display for dispalying the color information. Tretter, however, discloses a display for displaying color image data (Tretter col. 3 lines 45-47). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the aforesaid combination to include a display as taught by Tretter. Such a modification would have allowed for a user to preview the image processing results before a hard copy is made. This makes for a more efficient and less wasteful system.

With regard to claim 48, the inherency argument used above with respect to claims 41, 43 and 46 is applicable to the claim 48 limitation as well.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (571) 272-7390. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joe Mancuso can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick L Edwards Art Unit 2621

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ANDREW W. JOHNS
PRIMARY EXAMINER